Amendments to the Claims:

1. (Currently Amended) A method for the self-calibration of a tunable, diode pumped solid state laser in which the frequency or the wavelength of the laser radiation of the fundamental frequency and/or doubled frequency is changed, the method comprising:

tuning at least one optical element arranged in the cavity to traverse a maximum possible tuning range in a continuous manner by changing the optical cavity length by a piezo-actuator or Brewster window over the total amplification bandwidth of the laser-active material;

recording and storing performance curves of the at least one optical element during the step of tuning, the performances curves indicating the output power of the laser ~~a tuning of at least one optical element arranged in the cavity to traverse a maximum possible tuning range in a continuous manner~~;

generating or deriving a tuning function for the at least one optical element from ~~these~~ the performance curves by a microcontroller or computer; and

adjusting an optimum working point for the at least one optical element for maximum suppression of side modes by a digital or analog regulator with the help of a learning curve or learning characteristic derived from the performance curves.

2. (Previously Presented) The method according to claim 1, wherein the optical element is tuned with increasing amplitude for recording the learning curve and there is a correction of the deviation from the optimal position at the edge of the tuning range of another optical element.

3. (Previously Presented) The method according to claim 1, wherein the adjustment of the optical element is adapted to the change in length of the cavity.

4. (Previously Presented) The method according to claim 1, wherein for optimizing the optical element, the optical element is itself modulated or another optical element is modulated.

5. (Previously Presented) The method according to claim 1, wherein by modulating the optical element, a tuning characteristic of the latter or of another optical element is generated, recorded, and stored.

6. (Previously Presented) The method according to claim 1, wherein frequency-selective elements of the laser are adjusted between two mode jumps by the microcontroller or computer according to the recorded laser characteristic in such a way that side modes are suppressed to a maximum degree.

7. (Previously Presented) The method according to claim 1:

wherein the at least one optical element is an etalon; and

wherein the performance curve of the laser is recorded with a change of the rotational angle δ of the etalon and while maintaining a constant cavity length, and also with a change in the cavity length while keeping the etalon stationary.

8. (Previously Presented) The method according to claim 1, wherein the learning characteristic is adjusted in that the cavity length and the finest frequency-selective element of the laser determining the frequency is tuned with increasing amplitude, in that the mode jumps occurring at the edge of the tuning range are detected and/or registered by a suitable measuring instrument or via the output of the laser,

wherein the movement of the next coarsest frequency-selective element at the edge of the tuning range is then changed until a frequency jump in the characteristic no longer occurs, and wherein the entire position movement of the coarser element is then stored.

9. (Currently Amended) An arrangement for the self-calibration of a tunable, diode pumped solid state laser, wherein the arrangement comprises:

a laser diode as a pump light source ~~followed by~~ <u>and</u> in-coupling optics <u>positioned to receive the pump light</u>,

a laser crystal <u>and</u> ~~followed by~~ out-coupling optics or a nonlinear, frequency-doubling crystal, wherein the outer surfaces of the laser crystal, the out-coupling optics and frequency-doubling crystal have a reflective coating for the laser fundamental frequency

and/or for the frequency-doubled radiation and enclose a cavity between them, the laser crystal positioned to receive the pump light through the in-coupling optics;

an actuator ~~for varying~~ positioned to vary the cavity length for purposes of tuning and calibrating the laser to traverse a maximum possible tuning range in a continuous manner;

an etalon being provided inside the cavity for changing the tuning range and for determining the output power of the laser, wherein the etalon is rotatable or swivelable about an axis of rotation which extends at right angles to the optical axis of the laser or at an inclination to the latter by a small angle.

10. (Previously Presented) The arrangement according to claim 9, wherein the etalon is constructed as a transparent disk which is rotatable or swivelable about the axis of rotation and is angularly adjustable by an angular drive.

11. (Previously Presented) The arrangement according to claim 10, wherein a stepper motor at least one of whose coils is controllable by a controlling circuit, is provided as a drive device.

12. (Previously Presented) The arrangement according to claim 10, wherein a piezo-actuator in operative connection with the etalon directly or with an intermediary of additional elements is provided as drive device.

13. (Previously Presented) The arrangement according to claim 10, wherein a piezo-actuator comprises a bending element as a driving element.

14. (Previously Presented) The arrangement according to claim 10, wherein only one coil of a stepper motor is controlled in the angular drive.

15. (Previously Presented) The arrangement according to claim 10, wherein both coils of a stepper motor are controlled, and wherein a field vector is modulated to prevent hystereses.

16. (Previously Presented) The arrangement according to claim 10, wherein a motor is operated in microstep operation.

17. (Previously Presented) The arrangement according to claim 10, wherein the rotational axis of the etalon is arranged so as to be inclined at an angle δ of less than 10° in relation to a vertical line to the optical axis of the laser.

18. (Previously Presented) The arrangement according to claim 10, wherein a flexible element with good heat conductivity is provided for cooling a moving element.

19. (Previously Presented) The arrangement according to claim 10, wherein a element with good heat conductivity is made of copper.

20. (Previously Presented) The arrangement according to claim 10, wherein wedge-shaped crystals or other wedge-shaped optical elements are provided for preventing formation of parasitic etalons.

21. (Previously Presented) The arrangement according to claim 10, wherein a standing wave cavity is provided in such a way that a more secure single-frequency operation is achieved by means of suitable matching of the selectivity of the etalon with the suppression of side modes by spatial hole burning achieved by the arrangement and selection of thickness and doping of the laser crystal.

22. (Previously Presented) The arrangement according to claim 10, wherein the cavity length is less than 5 mm.

23. (Previously Presented) The arrangement according to claim 10, wherein a piezo-actuator with a stationary etalon is provided for tuning the laser, wherein the frequency step range FSB of the etalon is greater than the amplification bandwidth of the laser crystal and the fineness is selected in such a way that a secure single-frequency operation is ensured in the maximum tuning range.

24. (Previously Presented) The arrangement according to claim 10, wherein the etalon is moved jointly in order to achieve a larger tuning range.

25. (Previously Presented) The arrangement according to claim 10, wherein both coils of a stepper motor are controlled, wherein the position of the etalon is modulated.

26. (Previously Presented) The method of claim 1 wherein:

the at least one optical element is an etalon.